

# SEQUENCE LISTING

<110> AKZO Nobel N.V.

<120> Lawsonia intracellularis vaccine

<130> Lawsonia intracellularis vaccine

<140>

<141>

<160> 20

<170> PatentIn Ver. 2.1

<210> 1

<211> 656

<212> DNA

<213> Lawsonia intracellularis

<220>

<221> CDS

<222> (1)..(654)

<400> 1

gcg	gag	gtg	acg	gcg	agt	tgt	act	aaa	cgt	gtt	gaa	agc	tat	aat	tat	48
Ala	Glu	Val	Thr	Ala	Ser	Cys	Thr	Lys	Arg	Val	Glu	Ser	Tyr	Asn	Tyr	
1				5					10					15		

ctt	gtg	gat	tat	tca	ggc	tct	atg	atg	atg	aaa	cat	gtt	gct	gtt	aga	96
Leu	Val	Asp	Tyr	Ser	Gly	Ser	Met	Met	Met	Lys	His	Val	Ala	Val	Arg	
		20					25					30				

gag	cct	aaa	ata	gaa	tta	gca	aaa	gaa	gct	ata	tta	aaa	att	aat	gcg	144
Glu	Pro	Lys	Ile	Glu	Leu	Ala	Lys	Glu	Ala	Ile	Leu	Lys	Ile	Asn	Ala	
		35					40					45				

gca	atg	cct	aaa	atg	tca	tat	caa	ggc	gga	tta	tat	act	ttt	gca	cct	192
Ala	Met	Pro	Lys	Met	Ser	Tyr	Gln	Gly	Gly	Leu	Tyr	Thr	Phe	Ala	Pro	
	50					55					60					

tat	tct	gta	att	att	ccc	caa	ggc	tct	tgg	aat	tca	tgt	gtt	gcc	gaa	240
Tyr	Ser	Val	Ile	Ile	Pro	Gln	Gly	Ser	Trp	Asn	Ser	Cys	Val	Ala	Glu	
	65				70				75				80			

tgt	gcg	gtt	aat	aca	att	aag	tct	gat	tta	gaa	att	ttt	ggc	cgt	ctt	288
Cys	Ala	Val	Asn	Thr	Ile	Lys	Ser	Asp	Leu	Glu	Ile	Phe	Gly	Arg	Leu	
			85						90					95		



Ala Met Pro Lys Met Ser Tyr Gln Gly Gly Leu Tyr Thr Phe Ala Pro  
50 55 60

Tyr Ser Val Ile Ile Pro Gln Gly Ser Trp Asn Ser Cys Val Ala Glu  
65 70 75 80

Cys Ala Val Asn Thr Ile Lys Ser Asp Leu Glu Ile Phe Gly Arg Leu  
85 90 95

Thr Pro Val Gly Asp Gly Ile Lys Met His Glu Thr Val Ile Asn Gln  
100 105 110

Met Pro Pro Gln Ala Ala Val Ile Leu Leu Thr Asp Gly His Asn Asn  
115 120 125

Leu Gly Met Asn Pro Val Glu Glu Val Lys Ser Ile Tyr Gln Thr Asn  
130 135 140

Pro Asn Val Cys Phe His Val Val Ser Phe Ala Asp Asp Ala Glu Gly  
145 150 155 160

Lys Ala Ile Ile Asp Gln Ile Val Ala Leu Asn Ser Gly Ser Val Leu  
165 170 175

Val Asp Gly Leu Gln Leu Leu Gln Asn Pro Ala Val Cys Gln Glu Phe  
180 185 190

Val Asn Ser Val Phe Cys Gln Glu Gln Ile Leu Val Thr Glu Glu Val  
195 200 205

Val Val Leu Arg Gly Val Asn Phe Ala Phe  
210 215

<210> 3

<211> 1428

<212> DNA

<213> *Lawsonia intracellularis*

<220>

<221> CDS

<222> (1)..(1425)

<400> 3

gct att gat ttt aag gca aag ggg gtg tgg gac ttc aat ttt gag tgg 48  
Ala Ile Asp Phe Lys Ala Lys Gly Val Trp Asp Phe Asn Phe Glu Trp

1	5	10	15	
caa caa tct agt ttt atg aag ggc gat gga gat caa cgt ttt tcg cct				96
Gln Gln Ser Ser Phe Met Lys Gly Asp Gly Asp Gln Arg Phe Ser Pro				
20		25	30	
aaa caa cgt tta cgt act caa ata gac att gtt gca tca gag agt ctt				144
Lys Gln Arg Leu Arg Thr Gln Ile Asp Ile Val Ala Ser Glu Ser Leu				
35	40	45		
aag ggt gtt gta ttc ttt gaa tta ggt aag act atc tgg gga cgt ggt				192
Lys Gly Val Val Phe Phe Glu Leu Gly Lys Thr Ile Trp Gly Arg Gly				
50	55	60		
gtt gat ggt gct tct att gga aca gat ggt aaa aat gtt ata aag ctc				240
Val Asp Gly Ala Ser Ile Gly Thr Asp Gly Lys Asn Val Ile Lys Leu				
65	70	75	80	
cgt tat tcc tat gtt gat tgg gtt att cct tac aca gat gtg caa gtc				288
Arg Tyr Ser Tyr Val Asp Trp Val Ile Pro Tyr Thr Asp Val Gln Val				
85	90	95		
cgt atg ggt tta caa cct tat gtc ctt cca gga ttt gtt gca ggt tct				336
Arg Met Gly Leu Gln Pro Tyr Val Leu Pro Gly Phe Val Ala Gly Ser				
100	105	110		
aca ata tta gat gct gat gga gca ggt gtt act gtt tct gct gta ttt				384
Thr Ile Leu Asp Ala Asp Gly Ala Gly Val Thr Val Ser Ala Val Phe				
115	120	125		
aat gat tat tta ggt gct aca gct ttc tgg atg cgt gca ttg cat aaa				432
Asn Asp Tyr Leu Gly Ala Thr Ala Phe Trp Met Arg Ala Leu His Lys				
130	135	140		
aac tat gat agt aat tat gga ata tca aag cta cct aac ttt aaa ggt				480
Asn Tyr Asp Ser Asn Tyr Gly Ile Ser Lys Leu Pro Asn Phe Lys Gly				
145	150	155	160	
aca aca tta gat gta gtt gga tta act att cct gta aca ata tct gat				528
Thr Thr Leu Asp Val Val Gly Leu Thr Ile Pro Val Thr Ile Ser Asp				
165	170	175		
ata aaa att gct cca tgg ggt atg ttt gct ttt gca ggt aag aag agc				576
Ile Lys Ile Ala Pro Trp Gly Met Phe Ala Phe Ala Gly Lys Lys Ser				
180	185	190		
tta tta ggg gaa agc tat gga gat att gaa gat gta aga gca ggt ctt				624
Leu Leu Gly Glu Ser Tyr Gly Asp Ile Glu Asp Val Arg Ala Gly Leu				

195

200

205

tta cca gca atg cca gca gga ttt gga tat agc tgg gga gct ggt aat 672  
 Leu Pro Ala Met Pro Ala Gly Phe Gly Tyr Ser Trp Gly Ala Gly Asn  
 210 215 220

cca ttt gga gat gtt ttt cca aat aaa aag cgt ggt aat gca tgg tgg 720  
 Pro Phe Gly Asp Val Phe Pro Asn Lys Lys Arg Gly Asn Ala Trp Trp  
 225 230 235 240

gtt ggt tta tca gct gaa ctt gct ggc tca agt cct ttg cat ata gct 768  
 Val Gly Leu Ser Ala Glu Leu Ala Gly Ser Ser Pro Leu His Ile Ala  
 245 250 255

gtt gat ggt gct tat gga cga gca gac tta gga agt ctt aga aat gtt 816  
 Val Asp Gly Ala Tyr Gly Arg Ala Asp Leu Gly Ser Leu Arg Asn Val  
 260 265 270

gtt att ggt gac ttc tta cta gat aag att gat tta aaa cgt caa ggt 864  
 Val Ile Gly Asp Phe Leu Leu Asp Lys Ile Asp Leu Lys Arg Gln Gly  
 275 280 285

tgg tat gca gca tta tta gca gaa tat aaa ttt gaa tat gta act cca 912  
 Trp Tyr Ala Ala Leu Leu Ala Glu Tyr Lys Phe Glu Tyr Val Thr Pro  
 290 295 300

ggg gtt ata ggt tgg tat gcc tca gga gat aaa gtt gat tca cgt ggc 960  
 Gly Val Ile Gly Trp Tyr Ala Ser Gly Asp Lys Val Asp Ser Arg Gly  
 305 310 315 320

gcc tct aaa aga ata cca aca tta gtt gga aac tgg tca gca aca agt 1008  
 Ala Ser Lys Arg Ile Pro Thr Leu Val Gly Asn Trp Ser Ala Thr Ser  
 325 330 335

ttt gga tat agt gga gcc tat ggt ata ggc aaa gat tct gtt ttt gga 1056  
 Phe Gly Tyr Ser Gly Ala Tyr Gly Ile Gly Lys Asp Ser Val Phe Gly  
 340 345 350

aat act att gct ggc tca tgg ggt gtt gta gtt cag ttg aaa gat att 1104  
 Asn Thr Ile Ala Gly Ser Trp Gly Val Val Val Gln Leu Lys Asp Ile  
 355 360 365

tct ttc tta gaa aat cta act cat gtt atc cgt gga gct aga att cag 1152  
 Ser Phe Leu Glu Asn Leu Thr His Val Ile Arg Gly Ala Arg Ile Gln  
 370 375 380

ggt aca aat aat aaa gac gtt cct gaa cac tta ggt tta tca tac gtt 1200  
 Gly Thr Asn Asn Lys Asp Val Pro Glu His Leu Gly Leu Ser Tyr Val

385	390	395	400	
act acc att tat gac aca cgt ggt ggt gat aat atg ctt tac tta aca	1248			
Thr Thr Ile Tyr Asp Thr Arg Gly Gly Asp Asn Met Leu Tyr Leu Thr				
405	410	415		
aag aaa gat tat gct tgg gaa gta gat ttt gat act gaa tat aaa atc	1296			
Lys Lys Asp Tyr Ala Trp Glu Val Asp Phe Asp Thr Glu Tyr Lys Ile				
420	425	430		
tat aaa gac tta agt gta gct ctt gaa ctg tca tat att cgt ctt gaa	1344			
Tyr Lys Asp Leu Ser Val Ala Leu Glu Leu Ser Tyr Ile Arg Leu Glu				
435	440	445		
ctt gat aaa aaa cta tgg aac ctt caa aga gaa gtt gat aag aat gcc	1392			
Leu Asp Lys Lys Leu Trp Asn Leu Gln Arg Glu Val Asp Lys Asn Ala				
450	455	460		
tat cgt gct ggt tta aat atg aag tat caa ttc taa	1428			
Tyr Arg Ala Gly Leu Asn Met Lys Tyr Gln Phe				
465	470	475		
<210> 4				
<211> 475				
<212> PRT				
<213> Lawsonia intracellularis				
<400> 4				
Ala Ile Asp Phe Lys Ala Lys Gly Val Trp Asp Phe Asn Phe Glu Trp				
1	5	10	15	
Gln Gln Ser Ser Phe Met Lys Gly Asp Gly Asp Gln Arg Phe Ser Pro				
20	25	30		
Lys Gln Arg Leu Arg Thr Gln Ile Asp Ile Val Ala Ser Glu Ser Leu				
35	40	45		
Lys Gly Val Val Phe Phe Glu Leu Gly Lys Thr Ile Trp Gly Arg Gly				
50	55	60		
Val Asp Gly Ala Ser Ile Gly Thr Asp Gly Lys Asn Val Ile Lys Leu				
65	70	75	80	
Arg Tyr Ser Tyr Val Asp Trp Val Ile Pro Tyr Thr Asp Val Gln Val				
85	90	95		
Arg Met Gly Leu Gln Pro Tyr Val Leu Pro Gly Phe Val Ala Gly Ser				

100	105	110
Thr Ile Leu Asp Ala Asp Gly Ala Gly Val Thr Val Ser Ala Val Phe		
115	120	125
Asn Asp Tyr Leu Gly Ala Thr Ala Phe Trp Met Arg Ala Leu His Lys		
130	135	140
Asn Tyr Asp Ser Asn Tyr Gly Ile Ser Lys Leu Pro Asn Phe Lys Gly		
145	150	155
160		
Thr Thr Leu Asp Val Val Gly Leu Thr Ile Pro Val Thr Ile Ser Asp		
165	170	175
Ile Lys Ile Ala Pro Trp Gly Met Phe Ala Phe Ala Gly Lys Lys Ser		
180	185	190
Leu Leu Gly Glu Ser Tyr Gly Asp Ile Glu Asp Val Arg Ala Gly Leu		
195	200	205
Leu Pro Ala Met Pro Ala Gly Phe Gly Tyr Ser Trp Gly Ala Gly Asn		
210	215	220
Pro Phe Gly Asp Val Phe Pro Asn Lys Lys Arg Gly Asn Ala Trp Trp		
225	230	235
240		
Val Gly Leu Ser Ala Glu Leu Ala Gly Ser Ser Pro Leu His Ile Ala		
245	250	255
Val Asp Gly Ala Tyr Gly Arg Ala Asp Leu Gly Ser Leu Arg Asn Val		
260	265	270
Val Ile Gly Asp Phe Leu Leu Asp Lys Ile Asp Leu Lys Arg Gln Gly		
275	280	285
Trp Tyr Ala Ala Leu Leu Ala Glu Tyr Lys Phe Glu Tyr Val Thr Pro		
290	295	300
Gly Val Ile Gly Trp Tyr Ala Ser Gly Asp Lys Val Asp Ser Arg Gly		
305	310	315
320		
Ala Ser Lys Arg Ile Pro Thr Leu Val Gly Asn Trp Ser Ala Thr Ser		
325	330	335
Phe Gly Tyr Ser Gly Ala Tyr Gly Ile Gly Lys Asp Ser Val Phe Gly		
340	345	350
Asn Thr Ile Ala Gly Ser Trp Gly Val Val Val Gln Leu Lys Asp Ile		

100450010001

355

360

365

Ser Phe Leu Glu Asn Leu Thr His Val Ile Arg Gly Ala Arg Ile Gln  
370 375 380

Gly Thr Asn Asn Lys Asp Val Pro Glu His Leu Gly Leu Ser Tyr Val  
385 390 395 400

Thr Thr Ile Tyr Asp Thr Arg Gly Gly Asp Asn Met Leu Tyr Leu Thr  
405 410 415

Lys Lys Asp Tyr Ala Trp Glu Val Asp Phe Asp Thr Glu Tyr Lys Ile  
420 425 430

Tyr Lys Asp Leu Ser Val Ala Leu Glu Leu Ser Tyr Ile Arg Leu Glu  
435 440 445

Leu Asp Lys Lys Leu Trp Asn Leu Gln Arg Glu Val Asp Lys Asn Ala  
450 455 460

Tyr Arg Ala Gly Leu Asn Met Lys Tyr Gln Phe  
465 470 475

<210> 5

<211> 12

<212> PRT

<213> Lawsonia intracellularis

<400> 5

Ala Ala Tyr Glu Tyr Leu Val Met Leu Gly Val Asn  
1 5 10

<210> 6

<211> 12

<212> PRT

<213> Lawsonia intracellularis

<400> 6

Gly Thr Gln Glu Tyr Asn Leu Ala Leu Gly Glu Arg  
1 5 10

<210> 7



<211> 11  
 <212> PRT  
 <213> Lawsonia intracellularis  
  
 <400> 7  
 Pro Phe Tyr Val Met Val Trp Thr Pro Arg Arg  
       1                  5                  10

<210> 8  
 <211> 20  
 <212> DNA  
 <213> Lawsonia intracellularis

<400> 8  
 tatagctggt gatggtgctt 20

<210> 9  
 <211> 19  
 <212> DNA  
 <213> Lawsonia intracellularis

<400> 9  
 ggtgataata tgctttact 19

<210> 10  
 <211> 19  
 <212> DNA  
 <213> Lawsonia intracellularis

<400> 10  
 atatgggggg gggggggggg 19

<210> 11  
 <211> 31  
 <212> DNA  
 <213> Lawsonia intracellularis

<400> 11  
 ggaattccat atgtattgat tttaaggcaa a 31

<210> 12  
 <211> 30

<212> DNA  
 <213> Lawsonia intracellularis  
 <400> 12  
 cgcggatccg cgatccttga taattcaagg 30

<210> 13  
 <211> 36  
 <212> DNA  
 <213> Lawsonia intracellularis  
 <400> 13  
 ggaattccat atgaaaatga aaaagagcac tctggc 36

<210> 14  
 <211> 30  
 <212> DNA  
 <213> Lawsonia intracellularis  
 <400> 14  
 ccgctcgagg aattgatact tcatatttaa 30

<210> 15  
 <211> 12  
 <212> PRT  
 <213> Lawsonia intracellularis  
 <400> 15  
 Ala Glu Val Thr Ala Ser Cys Thr Lys Arg Val Gly  
 1 5 10

<210> 16  
 <211> 16  
 <212> PRT  
 <213> Lawsonia intracellularis

<400> 16  
 Gly Val Asn Phe Ala Phe Asp Ser Phe Ala Leu Asp Asp Thr Ala Lys  
 1 5 10 15

<210> 17

<211> 12  
<212> PRT  
<213> Lawsonia intracellularis

<400> 17  
Ile Asp Phe Lys Ala Lys Gly Val Trp Asp Phe Asn  
1 5 10

<210> 18  
<211> 11  
<212> PRT  
<213> Lawsonia intracellularis

<400> 18  
Lys Asp Tyr Ala Trp Glu Val Asp Phe Asp Thr  
1 5 10

<210> 19  
<211> 12  
<212> PRT  
<213> Lawsonia intracellularis

<400> 19  
Ala Ala Tyr Glu Tyr Leu Val Met Leu Gly Val Asn  
1 5 10

<210> 20  
<211> 12  
<212> PRT  
<213> Lawsonia intracellularis

<400> 20  
Gly Thr Gln Glu Tyr Asn Leu Ala Leu Gly Glu Arg  
1 5 10